

## 551 ft plugs RG 543-18-297

### Balanced Kick Off Plug Procedure (2 Plugs)

#### Tubing Stinger and Drill String:

1. RIH with **23 joints (approximately 720')** of 2-3/8" P-110 EUE tubing stinger string
2. M/U crossover sub and RIH with 5" drill pipe to 8850' stinger set depth (approximately 8130' of 5" DP)
3. Circulate minimum 2 times DP/tubing stinger capacity at 8 BPM (approximately 285 BBL)

#### Balanced Plug #1 (8850' – 8299'):

4. Pump 20 BBL 11.0 ppg of spacer at 5 BPM
5. Mix and pump 232 sks (41 BBL) of 17.0 ppg cement at ~5 BPM
  - Note start time of mixing and check density
  - Lab thickening time: **50 BC at 180 Minutes**
6. Pump 4 BBL of 11.0 ppg spacer at ~5 BPM
  - Note: Calculated 3.8 BBL spacer at balanced
7. Displace balanced plug with 134 BBL of 9.8 ppg mud at ~3 BPM (2 BBL under displaced)
  - Top of Spacer:
    - Inside: Drill pipe: 7933'
    - Outside: Open Hole x Drill Pipe Annulus: 7945'
  - TOC (assumed 8-3/4" gauged hole):
    - Inside 2-3/8" tubing: 8286'
    - Outside: Open Hole x 2-3/8" Tubing: 8286'
  - Total Mixing + Pump Time = approximately 60 minutes
8. Pull out of cement plug at 5 minutes per stand to 8200' (99' above TOC)
  - Balanced Plug TOC in open hole: 8299'
  - Total Pull to 8200' Time = approximately 50 minutes
9. **Immediately reverse circulate** minimum 1.5 times drill pipe/tubing stinger capacity and ensure fluid clean before pumping next plug
  - Stage up pumps and break circulating to avoid excess ECD on plug
  - Expect to observe ~15 bbl of spacer to surface
  - Total Reverse Circulate Time = 30 minutes
  - **Total Mixing Time + Pump Time + Pull Time + Reverse Circulate Time = 140 minutes**

#### Balanced Plug #2 (8299' -7748'):

10. Pump 20 BBL 11.0 ppg of spacer at 5 BPM (Tubing Stinger at 8299')
11. Mix and pump 232 sks (~41 BBL) of 17.0 ppg cement at ~5 BPM
  - Note start time of mixing cement and check density
  - Lab thickening time: **50 BC at 3 hours**
12. Pump 4 BBL of 11.0 ppg spacer at ~5 BPM
  - Note: Calculated 3.8 BBL spacer at balanced

13. Displace balanced plug with 123 BBL of mud at ~3 BPM (2 BBL under displaced)
  - Top of Spacer:
    - Inside: Drill pipe: 7283'
    - Outside: Open Hole x Drill Pipe Annulus: 7295'
  - TOC (assumed 8-3/4" gauged hole):
    - Inside 2-3/8" tubing: 7636'
    - Outside: Open Hole x 2-3/8" Tubing: 7636'
  - Total Mixing + Pump Time = approximately 60 minutes
14. Pull out of cement plug at 5 minutes per stand to 7600' (49' above TOC)
  - Balanced Plug TOC in open hole: 7649'
  - Top of spacer in open hole: 7326'
  - Total Pull to 7600' Time = approximately 50 minutes
15. Trip out of hole from 7600' to 7300' -- 3 stands at normal trip speed (~350' above TOC)
  - Total Trip Time = approximately 10 minutes
16. **Immediately reverse circulate** minimum 1.5 times drill pipe/tubing stinger capacity and ensure fluid clean before pumping next plug
  - Stage up pumps and break circulating to avoid excess ECD on plug
  - Total Reverse Circulate Time = 30 minutes
  - **Total Mixing Time + Pump Time + Pull Time + Reverse Circulate Time = 150 minutes**
17. TOOH to surface